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Reply to Office Action of March 24, 2004

REMARKS

Claims 23, 31 and 36 have been amended. Claims 23, 25-26, 31, 33-34 and 36 remain in the invention.

Claims 23, 25, 26, 31, 33, 34 and 36 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Number 4,759,489 to Pigott in view of Adhesives Handbook (pages 1-19, 28-31, 40-43 and 94). Applicant respectfully traverses this rejection.

U.S. Patent Number 4,759,489 to Pigott discloses a method of automobile body building by aligning a separate upper and lower body module that are joined together using a precision mating location for fitting the modules together. The invention of Pigott '489 is an improved method for automobile body building that is in contrast to the conventional practice of building the car body as an open box structure (column 1, lines 10-19). The body assembly method of Pigott '489 includes the steps of first forming an upper body module 50 that incorporates the roof area and then forming a lower body module 78 that incorporates the floor area. The method also includes the steps of providing precision formed mating locations 62 on the upper and lower body modules 78 and utilizing the mating locations on the upper module as a reference for fitting of the interior parts and equipment into the upper module 50. It is contemplated that one module has a precision drilled hole 82 and the other module has a precision turned pin 62 in order to align the two modules with respect to each other. The method further includes the steps of fitting the upper and lower modules together by use of the mating locations after the interior parts and equipment have been fitted into both modules. In this example, the upper and lower modules are locked together at the mating locations by bolting. The modules are permanently joined at a joining station by welding.

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Pigott also discloses an apparatus for automobile building that includes two sets of workstations. The first workstation 20 includes an upstream station at which an upper body module 50 incorporating a body roof area is formed having a set of locations that reference a master body point and at least one substation where subassemblies are fitted to the upper module utilizing the locations on the module to define reference axes, to ensure precision mounting of the subassemblies. The second set of workstations 22 includes a similar upstream station for a lower module incorporating a body floor area, and a mating station 30 at which the upper and lower modules and fitted subassemblies are mated together by use of the respective reference locations on the two modules. While Pigott discloses a sealer and/or adhesive station 28, it is prior to the mating station 30 or the joining station 32 (column 3, lines 21-27). Obviously, the sealer and/or adhesive station does not form a joint between the upper and lower modules, since the upper and lower modules have not yet been mated together. The sequencing of steps is critical in an assembly process, and cannot be viewed in isolation. The apparatus also includes a joining station 30 at which the mated upper and lower modules are permanently fixed together, such as by welding. Pigott '489 does not disclose a method of repetitively forming a joint between two members by defining a coverage portion and a fill portion and applying a viscous adhesive in a predetermined amount to secure the two members together, but rather a method of aligning two members using a precision mating surface.

The Adhesives Handbook is a guide for an adhesive designer concerned with adhesive bonding during an assembly process. The Handbook discusses classification of adhesives (pages 1-6), joint design examples (pages 7-17) and joint design criteria (pages 18-20). In particular, the Handbook suggests that to increase bond area, it is preferable to increase bond width. Similarly, to increase bond strength, the joint width is increased, rather than to increase joint

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overlap. The Handbook suggests various criteria, including adhesive used, material of adherents, temperature and pressure of cure, thickness of adhesive layer, age of bonded joint and environmental conditions. The Handbook suggests that a test should be conducted to determine the actual joint area required in light of the anticipated load. An estimate of the bond area can be made in light of the approximate failing stress of the adhesive and the above conditions as they will occur in an assembly line, and the specimens should be tested with the load applied as in the final assembly. Thus, the Handbook suggests that the joint size be determined from testing under various specified conditions prior to permanently forming the joint. The Handbook does not specifically disclose a method of repetitively forming a joint during a manufacturing process that specifies depositing adhesive up to fifty percent of the coverage portion and up to ten percent of the fill portion.

In contradistinction, amended claims 23, 31 and 36 clarify the invention as a method of repetitively forming a joint between two members during a manufacturing process using a viscous adhesive. The method includes the steps of positioning a first member to be in contact with a second member and the area of contact forms a coach joint. The joint includes a coverage portion extending along the first member from a first point on the first member to a second point, and a fill portion adjacent the coverage portion. The method also includes the steps of depositing adhesive along up to fifty percent of the coverage portion and up to ten percent of the coverage portion to consistently form a joint interconnecting the first member with the second member during the manufacturing process. The adhesive amount and placement of adhesive within the fill and coverage portions of the joint is designated to keep seepage to a minimum and stress transfer to a maximum. Claims 31 and 36 are similar to claim 23 and include further features. Claim 31 is directed to a coach joint. Claim 36 is directed to a lap joint, and the coverage portion

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is defined, and the adhesive is deposited between fifty to seventy-five percent of the coverage portion.

None of the references, alone or in combination with each other, teach or otherwise suggest the claimed invention of claims 23, 31 or 36 as amended. Specifically, the Pigott '489 reference merely discloses an improved apparatus and method for aligning together vehicle body sections to form a vehicle body. In the automobile body building method of Pigott '489, the vehicle body is separated into an upper portion and a lower portion. The upper portion and lower portion include formed mating locations for alignment purposes, such as a hole in one member and a corresponding peg in another member. The mating locations are used to temporarily pin together the upper and lower body portions, which are then permanently joined by welding. A weld joint is not the same as an adhesive joint. It is not formed the same way, and does not have the same characteristics. Further, in a weld joint, the weld material is deposited on an outside surface of the joined panels. The Examiner concurs with the Applicant that Pigott '489 does not disclose a method which specifies that adhesive is deposited up to fifty percent of the coverage portion and up to ten percent of the fill portion to form the joint, so that seepage of the adhesive from the joint is a minimum while stress transfer of the joint is a maximum. Further, Pigott does not disclose the various areas and length percentages specified by the Applicant, nor that the adhesive is viscous.

At the same time, the Examiner states that an assembly line method for an adhesive joint would inherently have a predetermined coverage length, and that the coverage percentage would be a predetermined percentage of the coverage length. As the Examiner has stated, in an assembly line process, every operation must be conducted the same to avoid variability between items. The Examiner also states that one of ordinary skill in the art would know to conduct

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routine experimentation, as set forth in the Handbook, to determine the best coverage area to create the strongest bond without risk of adhesive seepage. The Examiner further states that Figures 2.4, 2.5 and 2.6 of the Handbook illustrate the relationship between length and width of an adhesive bond and maximum bond strength. The Applicant agrees that in Figure 2.5, the effect of overlap and width on the strength of an adhesive joint is illustrated using two scenarios, the width held constant and the length varying, and the length held constant and the width varying.

The Applicant also agrees that it is obvious from the Handbook to conduct experiments to determine the length and width of overlap of a joint. This is precisely the point of the Applicant's invention, the length and width of overlap and deposit of adhesive are defined to avoid experimentation for consistently forming a joint in a manufacturing process.

At the same time, the Applicant asserts that it is not obvious from the Handbook to define a coach joint in terms of a coverage and a fill portion, and to repetitively deposit adhesive up to fifty percent of the coverage portion and up to ten percent of the fill portion, nor is it obvious to deposit adhesive between fifty to seventy percent of the coverage area of a lap joint. The step of experimentally establishing the amount of physical overlap of a joint is not the same as the step of defining a coverage portion and a fill portion and specifying for each portion the amount of adhesive used to form the joint.

The Handbook merely discloses an experimental method of determining the dimensional characteristics of adhesive bonded joints prior to forming the desired joint. The method disclosed by the Handbook relies on testing various joint sizes in light of predetermined conditions that replicate the conditions in the assembly plant. The joint sizes and failing stresses

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are plotted on a graph and the graph is utilized to calculate the required joint overlap. Clearly, this experimental process occurs outside of and prior to a manufacturing process.

Pigott '489 and the Handbook do not disclose a method that specifically includes the step of defining a coverage portion and/or fill portion for the joint. Pigott '489 and the Handbook do not disclose a method that includes the step of repetitively forming a joint by providing a first member having a coverage portion extending along the first member from a first point at a first end of the first member to another point at which the first member begins to curve to form a tangent portion. Pigott '489 and the Handbook also do not disclose a method with the step of providing a second fill portion extending from the second point to a line segment that is collinear to the tangent portion. Pigott '489 and the Handbook further do not disclose the step of depositing adhesive along up to fifty percent of the coverage portion and up to ten percent of the fill portion to repetitively form a joint during a manufacturing process.

A joint having a coverage portion and a fill portion and adhesive deposited along a specified portion of the flange coverage portion and the flange fill portion is not the same structure as a first member having a hole and a second member having a corresponding peg for temporarily fixing the first and second members together, and permanently welding the first and second members together. The function of the mating locations of Pigott '489 is to locate the first and second members with respect to each other and hold them together prior to permanently fixing them together, and not provide a surface area for forming an adhesive filled joint, as disclosed by the Applicant.

The combination of references, if even combinable, would not render obvious Applicant's invention as claimed in claims 23, 31 and 36 as amended. The combination of Pigott '489 and the Handbook would yield a first workstation at which an upper body module is formed

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having a set of locations that reference a master body point and at least one substation where subassemblies are fitted to the upper module utilizing the locations of the modules to define reference axis, to precision mount the subassemblies. A similar lower body module would be formed at a second set of workstations. The combination would also include a joining station where the mated upper and lower modules are permanently fixed together, using welding. The type of joint and the amount of overlap between the upper module and the lower module would be determined by experimentation, wherein the length and width of overlap of the upper body module and lower body module are varied.

Such a combination is clearly distinguishable from Applicant's invention, in that the present invention is a method that includes the steps of defining a coverage portion and a fill portion within the overlap area of the two members, and applying an adhesive along up to fifty percent of the coverage portion and up to ten percent of the fill portion to repetitively form the joint. The unobvious feature of the present application is to define the coverage and fill portion of the overlapped member and to specify the amount of adhesive applied in each portion. That is, the adhesive is deposited along up to fifty percent of the coverage portion and up to ten percent of the fill portion to form a coach joint.

The suggested combination does not disclose or even suggest a method for applying the adhesive by defining a coverage and fill portion for the joint and the amount of adhesive deposited in each portion, as disclosed by the Applicant. Neither Pigott nor the Handbook disclose or suggest how much sealer to use, or where to apply the sealer. The novelty of the Applicant's invention is that a method is provided for determining the amount of adhesive to use with respect to defined areas of the joint, to repetitively form a joint that maximizes stress transfer while minimizing seepage.

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The Examiner states that one of ordinary skill in the art would know to conduct routine experimentation, as suggested in the Handbook, to determine the best coverage area for creating the strongest bond without risk of failure. The Applicant agrees with the Examiner that one of ordinary skill in the art reading the Adhesives Handbook would be inclined to conduct routine experimentation to determine bond area. Applicant does not disclose or suggest the use of routine experimentation to determine the best coverage area for creating the strongest bond without risk of failure. Again, the novel aspect of the present invention eliminates the need for routine experimentation, since the coverage portion and the fill portion of the coach joint are defined, and the adhesive is deposited along up to fifty percent of the defined coverage portion and up to ten percent of the defined fill portion, to repetitively form a tight joint, and for a lap joint between fifty to seventy-five percent of the coverage portion. This methodology clearly is not obvious from the combination of Pigott and the Adhesives Handbook.

According to the MPEP 2141, the standard to follow in determining obviousness is that factual inquiries set forth in *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966). These include determining the scope and contents of the prior art, ascertaining the difference between the prior art and the claims in issue, resolving the level of ordinary skill in the pertinent art and evaluating evidence of secondary consideration. According to the MPEP, the Applicant's invention must be considered as a whole, the references must also be considered as a whole and suggest the desirability of making the combination of references. Further, the references must be viewed without impermissible hindsight and there is a reasonable expectation of success. The Applicant has described in detail the scope and contents of the prior art, set forth the difference between the prior art and the claimed invention, and described the ordinary skill in the art. In order to make a prima facie case of obviousness, the teachings or suggestion to make the claimed

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combination must be found in the prior art and not in the Applicant's disclosure. Further, the Examiner must provide an objective reason to combine the teachings of the reference. The Applicant submits that there is no teaching in the prior art cited by the Examiner to suggest a method of repetitively forming an adhesive joint during a manufacturing process by defining the coverage portion and the fill portion of the coach joint, and depositing adhesive along up to fifty percent of the defined coverage portion and up to ten percent of the defined fill portion, to form the joint. Similarly, for a lap joint the adhesive is deposited between fifty to seventy-five percent of the coverage portion. These dimensions and adhesive deposit locations are defined so that stress transfer is maximized and seepage is minimized. The problem solved by the Applicant is different than the problem solved by the cited references and there is no reason, suggestion or motivation to combine the references. There is simply no motivation in the cited references to combine the body module mating art of Pigott '489 that uses a welded joint with the Adhesives Handbook. The novelty of Pigott '489 is how the body modules are separately formed and then joined together by welding. A weld joint is simply not the same as an adhesive joint.

The Examiner cannot use the Applicant's invention as an instruction manual or template to piece together the disparate teachings of the prior art so that the claimed invention can be rendered obvious. In this instance, the Examiner is making broad-based assumptions regarding an assembly line and adhesive coverage. Yes, in an assembly line the amount of adhesive and placement of adhesive would be specified. Yes, the Adhesives Handbook suggests that routine experimentation can be used to determine the best coverage area to create a strong bond. But, the Adhesives Handbook is very general and does not state what experiments to conduct or the end result of such experimentation. The art of joint-forming is very old, and as such, advances are narrow, but still novel. The Applicant provides a new and novel method of repetitively

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forming a joint during a manufacturing process that eliminates the need for experimentation. It is respectfully submitted that the Examiner's stated conclusion of obviousness is based on speculation and hindsight reconstruction of the claimed invention from various disparate teachings in the prior art.

Therefore, it is respectfully submitted that claims 23, 31 and 36, and the claims dependent therefrom are allowable over the rejection under 35 U.S.C. §103(a).

Claims 23, 25, 26, 31, 33, 34 and 36 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent Number 5,849,122 to Kenmochi et al. in view of Adhesives Handbook (pages 1-19, 28-31, 40-43 and 94). Applicant respectfully traverses this rejection.

U.S. Patent Number 5,849,122 to Kenmochi et al. discloses a method of fabricating a vehicle body panel having a honeycomb sandwich structure. Kenmochi et al. '122 contemplates that the vehicle panel 14 will have a first plate 30, a second plate 22 and a honeycomb core 28 sandwiched between the first plate and the second plate. It is contemplated that the second plate 22 is an integral part of a structural panel of the vehicle body. It is also contemplated that the honeycomb sandwich structure is composed of a pre-formed sub-honeycomb panel 26 having a predetermined shape and includes the first plate 30 connected to a first surface of the honeycomb core 28.

The method includes the steps of strengthening the second plate 22 by connecting the structural panel 14 to a structural member, and the second plate 22 is integral to the structural panel 14 and the strength member is part of the vehicle body framework. The method also includes the step of pressing the pre-formed sub-honeycomb panel 26 against the second plate with an adhesive layer 24 or sheet therebetween, to connect a second surface of the honeycomb core to the second plate 22. The second surface of the honeycomb core is located opposite of the

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first surface. The honeycomb core 28 is made of a permeable, paper material, such that pressing the sub-honeycomb panel 26 against the second plate occurs immediately after a drying step conducted after washing of a painting stage of the vehicle body, to prevent the honeycomb core from getting wet. The step of pressing the sub-honeycomb panel also includes the step of releasing pressure formed within the sub-honeycomb panel 26 by the pressing step, to prevent damage to the sub-honeycomb core due to pressure inside a plurality of cells in the sub-honeycomb as a result of pressing onto the strengthened second plate. Kenmochi et al. '122 does not disclose a method of repetitively forming a joint where the coverage portion and the fill portion of the coach joint are defined, and a viscous adhesive is deposited along up to fifty percent of the defined coverage portion and up to ten percent of the defined fill portion.

None of the references, alone or in combination with each other, teach or otherwise suggest the claimed invention of claims 23, 31 or 36 as amended, or the claims dependent therefrom. Specifically, the Kenmochi et al. '122 reference merely discloses a method for constructing a vehicle body panel that has a first plate, a second plate, and a honeycomb core sandwiched between the first and second plate. Two adhesive layers or sheets are positioned between the honeycomb layer and the plates. The adhesive layer is defined by Kenmochi '122 as an "adhesive sheet having a substantial thickness" (column 7, lines 9-24). The Handbook merely discloses a method of determining the dimensions of adhesive bonded joints. The method relies on testing various joint sizes in light of predetermined conditions that replicate the conditions in the assembly plant. The joint sizes and failing stresses are plotted on a graph and the graph is utilized to calculate the required joint overlap.

Kenmochi et al. '122 and the Handbook do not disclose or suggest a method that includes the step of repetitively forming a joint by defining a coverage portion and a fill portion.

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Kenmochi et al. '122 and the Handbook do not disclose or suggest a method that includes the step of forming a coach joint by providing a first member having a coverage portion extending along the first member from a first point at a first end of the first member to a second point at which the first member curves to form a tangent portion. Kenmochi et al. '122 and the Handbook also do not disclose, anticipate or otherwise suggest the step of providing a second fill portion extending from the second point to a line segment that is collinear to the tangent portion. Kenmochi et al. '122 and the Handbook further do not disclose or otherwise suggest the step of depositing adhesive along up to fifty percent of the coverage portion and up to ten percent of the second fill portion to form a coach joint.

The combination of references, if combinable, would not render obvious Applicant's invention as claimed in claims 23 or 31 as amended. The combination of Kenmochi '122 and the Handbook would yield a vehicle body panel having a honeycomb laminate structure. The type of adhesive sheet used to secure the laminate would be determined by experimentation.

Such a combination is distinguishable from Applicant's invention, in that the present invention is a method of defining a coverage portion and a fill portion within the overlap area of the two members, and applying a viscous adhesive along up to fifty percent of the coverage portion and up to ten percent of the fill portion to form the coach joint, or between fifty to seventy-five percent of the coverage portion for a lap joint. The unobvious feature of the present application is to define the coverage and fill portion of the overlapped joint and to define the amount of viscous adhesive applied in each portion. That is, the adhesive is deposited along up to fifty percent of the coverage portion and up to ten percent of the fill portion to form a coach joint.

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The suggested combination does not disclose or even suggest a method for applying the viscous adhesive by defining a coverage and fill portion for the joint and the amount of adhesive deposited in each portion, as disclosed by the Applicant. Kenmochi teaches away from the present invention by disclosing that the adhesive layer is a sheet having a substantial thickness, it does not relate the dimensions of the sheet to a defined coverage portion and fill portion.

Again, the Examiner states that one of ordinary skill in the art would know to conduct routine experimentation, as suggested in the Handbook, to determine the best coverage area for creating the strongest bond without risk of seepage. The Applicant agrees with the Examiner that one of ordinary skill in the art would be inclined to conduct routine experimentation prior to the manufacturing process, as previously discussed in this Response. The novelty of the present invention is that the need for routine experimentation is eliminated, since the coverage portion and the fill portion of the coach joint are determined in advance, and the viscous adhesive is deposited along up to fifty percent of the defined coverage portion and up to ten percent of the defined fill portion, to form the coach joint, and between fifty to seventy-five percent of the coverage portion for a lap joint.

As previously stated, the standard to follow in determining obviousness is that factual inquiries set forth in *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966). These include determining the scope and contents of the prior art, ascertaining the difference between the prior art and the claims in issue, resolving the level of ordinary skill in the pertinent art and evaluating evidence of secondary consideration. According to the MPEP, the Applicant's invention must be considered as a whole, the references must also be considered as a whole and suggest the desirability of making the combination of references. Further, the references must be viewed without impermissible hindsight and there is a reasonable expectation of success.

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The Applicant has described in detail the scope and contents of the prior art, set forth the difference between the prior art and the claimed invention, and described the ordinary skill in the art. In order to make a prima facie case of obviousness, the teachings or suggestion to make the claimed combination must be found in the prior art and not in the Applicant's disclosure. Further, the Examiner must provide an objective reason to combine the teachings of the reference.

The Applicant submits that there is no teaching in the prior art of Kenmochi '122 and the Adhesives Handbook cited by the Examiner, to suggest the a method of consistently forming a joint during a manufacturing process by defining the coverage portion and the fill portion of the coach joint, and depositing a viscous adhesive along up to fifty percent of the defined coverage portion and up to ten percent of the defined fill portion, to form the joint. Similarly, for a lap joint the adhesive is deposited between fifty to seventy-five percent of the coverage portion. These dimensions and adhesive deposit locations are defined so that stress transfer is maximized and seepage is minimized.

The problem solved by the Applicant is different than the problem solved by the cited references and there is no reason, suggestion or motivation to combine the references. The Examiner cannot use the Applicant's invention as an instruction manual or template to piece together the teachings of the prior art so that the claimed invention can be rendered obvious. In this instance, the Examiner is making broad-based assumptions regarding an assembly line and adhesive coverage. Yes, in an assembly line the amount of adhesive and placement of adhesive would be specified. Yes, the Adhesives Handbook suggests that routine experimentation be used to determine the best coverage area to create a strong bond. But, the Adhesives Handbook does not state what experiments to conduct or the end result of such experimentation. The art of joint-

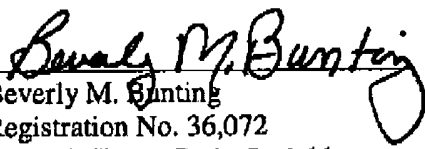
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forming is very old, and as such, advances are narrow, but still novel. The Applicant provides a new and novel method of repetitively forming a joint using a viscous adhesive during a manufacturing process. It is respectfully submitted that the Examiner's stated conclusion of obviousness is based on speculation and hindsight reconstruction of the claimed invention from disparate teachings in the prior art.

Therefore, it is respectfully submitted that claims 23, 31 and 36, as amended, and the claims dependent therefrom are allowable over the rejection under 35 U.S.C. §103(a).

Based on the above, Applicant submits that the claims are in a condition for allowance, which allowance is respectfully solicited. If the Examiner finds to the contrary, it is respectfully requested that the undersigned in charge of this application be called at the telephone number given below to resolve any remaining issues.

Respectfully submitted,


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